TRW W6TRW AMATEUR RADIO CLUB

CROSSTALK

TRW SEA

A Publication of the TRW Amateur Radio Club

W6TRW WINS CLASS 7A AND 10th PLACE OVERALL FOR 1994 FIELD DAY

DECEMBER 1994 CALENDAR

Every Monday: DCS Net on 145.32 Repeater at 7:30 PM

Every Wednesday: Emergency Communications Team Net on 145.32 Repeater at Noon

Every Thursday: Club Net on 145.32 Repeater at 7 PM, Club news, etc.

Every Friday: Club Breakfast in Bldg S cafeteria, 7-8 AM

Dec 6: Executive Board Meeting, E2/1200, 5:30 PM

Dec 13: Emergency Communications Team Meeting, R3/1413, Noon

Dec 13: Christmas Party, 5:30 PM at Petrelli's

Dec 16: Technical Chairman's Meeting, Bldg S Shack, Noon

Dec 31: Swap Meet, Parking lot, NW corner of Aviation & Marine, 7-11:30 AM, T-HUNT at Noon

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EDITORS NOTES: The deadline for CROSSTALK submissions is the executive board meeting on the first Tuesday of each month. If you have something and will be later than that please call and I will try to accommodate you.

HAPPY HOLIDAYS

W6TRW MAKES THE TOP TEN IN FIELD DAY FOR THE SECOND YEAR IN A ROW: With 13,956 points our Field Day team won class 7a and placed 10th overall for 1994. Congratulations to John Shepherd and the whole team. With the solar minimum upon us we will have to work harder for points next year. More operators and volunteers are needed for 1995. Operating in a fun contest like Field Day is a good way to improve your operating skills and for you newcomers to learn basic operating procedures. Please call John if you want to participate.

BOOK REVIEW: *CQ 1995 Equipment Buyers Guide*

The popular *CQ Equipment Buyers Guide* is more than a listing of available amateur radio equipment. The first quarter of the book is devoted to articles that are aimed at helping new hams get started and make the right choices. The 1995 edition has articles on setting up your first ham station, antenna basics, towers, DXing, exotic VHF/UHF modes and how to pass your General test.

Ham radio equipment is broken down into 20 categories and listed by manufacturer. Dealer's and manufacturer's addresses and phone numbers are listed to assist you in locating a product. At $5.95 this book is a bargain. I highly recommend it to hams of all experience levels.

For Sale:

- Ten Tec Argonaut II QRP Transceiver, 5 watts out on all bands 160-10 meters, general coverage receiver. $900/obo. Excellent condition.
- Kent Iambic Paddle Key. Excellent Cond. $50.

Call Bill Shanney, KJ6GR (310) 542-9899 evenings after 6 p.m.

For Sale:

- Kenwood TS-440 HF Radio with built in automatic antenna tuner. Excellent condition. $800/obo.

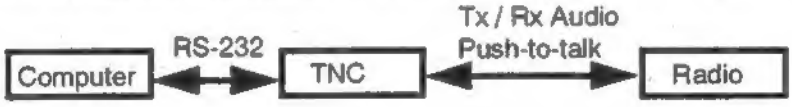
Contact Rich Sauer, N6CIZ. (310)813-5869.

Getting Started in VHF / UHF Packet Radio

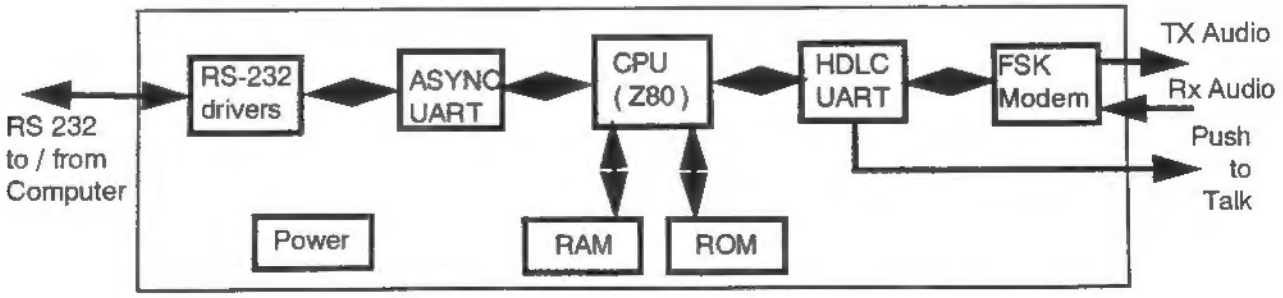
David Bloodgood, KD6PRO

Packet radio links two of the most popular hobbies available today - amateur radio and home computing. With a packet station, you can exchange e-mail with other hams, in the immediate area, across the country and around the world. There is a network of nodes - which allow keyboard-to-keyboard QSO's across the west. Dx operators use the DX-Cluster to communicate the frequencies where rare stations are operating. Packet-to-internet gateways allow you to have your own personal on-ramp to the information superhighway. The World-Wide conference provides real-time, party-line like communications with other hams all around the world - its a great way to operate DX with a no-code license ! In this article, I will discuss how to get started in packet radio - what a packet station is, how to set one up and how to make your first connection. Future articles will get into the details of some of these other services.

Setting up a packet station is easy - all you need is a radio (with antenna), a computer (or an old computer terminal) and an interface between the computer and the radio. This interface is commonly called a Terminal Node Controller or a TNC. The TNC serves the same function as the telephone modem that you probably already have in your computer - It modulates audio with the computer data for transmit and demodulates received audio, passing the data to the computer (Modem is a contraction of Modulator/Demodulator). In fact, there are TNC's that are built onto IBM PC compatible plugin cards, exactly like an internal computer telephone modem (No you can't use your telephone modem for packet - there is no push-to-talk !). The maximum allowable data rate is regulated by the FCC, and is a function of the frequency being used - 300 baud is the limit for HF packet, 1200 baud is commonly used on VHF / UHF bands. 9600 baud is also used on the UHF / VHF bands, with specially modified radios. Once you have a TNC, all you have to do is make the connections as shown below, install some software on the computer and you are on the air.



The majority of the TNCs available on the market today are derived from a design developed, and placed into the public domain by the Tucson Amateur Packet Radio (TAPR) organization. The TAPR TNC design includes a stand-alone computer, which permits 24 hr / day packet operation without the computer being on - The external computer is only required when you want to operate or send / receive email. In the TNC-2 design (as shown below), a microprocessor (usually a Z80) coordinates the data flow between the radio and the host computer. A single chip FSK modem interfaces the radio to the HDLC UART, which implements the fundamentals of the amateur packet protocol (known as AX-25). The remainder of the protocol is implemented in the microprocessor, which passes the received data to the host computer via the RS-232 interface. The microprocessor executes a program stored in the ROM, using RAM as required to store temporary data, along with incoming and outgoing mail messages.



Buying your first TNC is one of the more interesting challenges in amateur radio - there are so many choices, so many opportunities to visit the candy store and to spend money ! Seriously, I suggest that you start off simply (low cost) and upgrade when your interest increases (and your bank account recovers). There are 5 general types of TNCs - Single mode, multi-mode, multi-rate, multi-port and digital signal processing. The single mode TNCs (KPC-3, PK-88, DPK-88 and MFJ-1270B) are generally clones of the TNC-2 - they connect to a single radio and support operation at 1200 baud for VHF / UHF packet. These units have a "Personal Mailbox" that allows your friends to leave mail for you when you aren't in the shack. The MFJ unit also operates at 300 baud - allowing you to operate packet on the HF bands. The multi-mode units (MFJ-1278B, PK-232MBX, KAM, PK-900) add many HF modes - RTTY, AMTOR, NAVTEX, CW, PACTOR to the features of the single mode TNCs. Several of these multi-mode units provide dual radio ports (PK-900, KAM) - allowing cross-band operation. The multi-rate TNCs (KPC-9612, PK-96) allow operation at both 1200 and 9600 baud, with the proper radio connections. The multi-port units (DataEngine) will operate with 2 radios simultaneously - allowing your station to become a cross-band packet gateway. Some TNCs (DSP-1232, DSP-2232) feature digital signal processors - the modems are implemented in software in a special purpose computer - which provides improved performance and allows special purpose modems to be downloaded into the TNC. I recommend that you start off with one of the single-mode TNCs - unless you expect (and are licensed) to operate packet in the HF bands, in which case you should consider the multi-mode units. Many HAMs end up with many TNCs (I have 3), so if you buy a single mode to start with, you'll probably get a multi-mode eventually !

Since the TAPR TNC has built-in intelligence, it is extremely simple to interface to the host computer - just connect the RS-232 port to one of the COMM ports on your IBM PC and install the simple terminal software provided with the TNC. Traditional terminal programs, like PROCOMM or TELIX will work fine also, and provide more features than the free-ware. More elaborate programs, (PKGOLD and KAGOLD) provide a more user-friendly interface to the TNC and allow you to connect to multiple stations simultaneously. Its a good idea to familiarize yourself with the operation of the TNC before you connect the radios - you can't inadvertently interfere with anyone while experimenting if there is no radio ! Read the TNC manual and try all of the commands.

Nearly any radio will work for packet - I used my Handi-Talkie when I got started - it worked fine, although the intermods were sometimes a problem. Many hams use their HT when they operate "portable-packet" - with a lap-top computer. Mobile radios are ideal for packet - the higher power levels are helpful when you are trying to connect to nodes across the LA basin. You don't need the newest, most feature laden radio either - packet stations never have a PL tone, generally operate simplex and there are only a few frequencies set aside for packet operations - so you don't need many memories either. Old 2m rigs are easily found at swapmeets - with the correct crystals you can set up a packet station very inexpensively. The LA basin has a very extensive network of multi-frequency packet nodes (including KD6PRO-3 on 144.93 MHz @ 1200 baud) - which you can use to make cross-frequency connections - so having a single frequency, cystal controlled radio is no problem. Old commercial radios are ideal for packet operations - usually well built, crystal controlled and available for very low prices at swap meets. Most packeteers use omni-directional antennas - I have a dual-band Ringo that works great.

Hooking up a TNC is nearly as easy as connecting as cassette recorder to your stereo - all you have to do is feed the audio to and from your radio to the TNC, along with the push-to-talk signal. Be careful to keep the signals straight - the speaker / headphone output from the radio goes the RX audio input to the TNC and the TX audio output from the TNC goes to the microphone input to the TNC. TNC manuals describe how to wire them to most radios, and most recent radio manuals describe how to connect the TNC. Simply buy the appropriate connectors from Radio Shack, along with about 10' of shielded cable. I always use separate shielded wires for the TX and RX audio, for improved isolation. Handitalkies sometimes require the use of a capacitor and a resistor to combine the TX audio and the push-to-talk signal. These components can be installed inside the shell of the connector. If all else fails,

or you want to avoid all of the "fun" of soldering a cable, MFJ sells pre-made radio to TNC cables, so you can get plug-and-play operation.

Once you've gotten your packet station connected up, tune your receiver to one of the local packet frequencies - try 145.01 or 145.03 MHz and adjust the volume until the received data led blinks when you hear a packet being received (a "BRAAAAAP"). Configure your TNC into monitor mode and you should see messages appearing on your screen - with the call-signs of the stations communicating. If you hear the packets, but the led doesn't blink, check the wiring between the radio and the TNC, if the led blinks, but there is no data on the screen, double check the COMM port setup - did you plug into the correct port, is the baud rate right ? Before you try to connect to someone, you need to set your transmit deviation - simply tune another receiver to the packet frequency and enter a connect command - your radio will transmit a burst of data. Listen to the burst of data and adjust the transmit deviation control (inside the TNC) until your bursts of data sound are the same volume as the ones already on channel. If the transmit led on the TNC lights, but the radio doesn't key-up, you need to check the TNC to radio wiring - make sure its correct ! After you have set the deviation - try to connect to one of the stations you heard - chances are you will connect and will be in the middle of your first packet QSO ! The table below summarizes the simplex packet frequencies used in the LA area, describing some of the stations that you will find on each frequency. Another popular frequency is the WB6YMH packet repeater on 145.360 MHz with a transmit offset of -600 KHz. This repeater provides excellent coverage of the entire southbay. Skip (WB6YMH) was a pioneer in amateur packet radio, he still runs a great system - the WB6YMH-2 BBS is the home BBS for many W6TRW members (including myself) and WB6YMH-4 provides cross-band connectivity to other packet nodes on 439.025 MHz @ 9600 baud.

I encourage you to try these frequencies - You'll be amazed at what you will find on the air in the packet bands. I look forward to hearing you on the air - leave me some email - either on WB6YMH-2 or on KD6PRO-3 - my own node ! Good Luck and 73's de Dave.

Frequency	Users
144.930	Tcp/Ip - W6PDZ-6 Conference Server, KD6PRO-3 BBS / gateway to 9600 baud network
145.010	Big Bear Node - BGBEAR (AA6TN-1) - Provides connectivity to Las Vegas and Arizona
145.030	K6VE BBS and node (LANODE) - Provides connectivity to nearly all other frequencies
145.050	N6YN BBS in Westchester
145.070	C0LEGE node (WB6UCD-7) - gateway to 439.035 MHz @ 9600 baud
145.090	W6VIO-1 BBS and internet gateway at JPL
145.610	W6TRW-1 BBS, DCS Network
145.630	WB6WFH -1 BBS - Agoura Packet Association, San Fernando Valley (SFVBBS)
145.650	Not to busy - Ideal for keyboard to keyboard contacts in the south bay
145.670	Not to busy - Ideal for keyboard to keyboard contacts in the south bay
145.690	AA6SF - South Bay DX Packet Cluster

European Frequency Allocations

If you wonder where those missing European DX stations are, this list may help you find out why you don't hear 160M stations from Ireland!

ITU Region 1 - "CEPT" (Community of European Countries) - some statistics, band allocations and licensing data. Excerpts from a document titled "Information of Licenses of Radio Amateurs in the CEPT Countries", (document No. RR [92] 31), published by the High Director-ate of Telecommunications and Post in Groningen, The Netherlands. This document was handed over to me when I obtained my HA-land license. I was very pleasantly surprised of the efficient handling of my petition for my HA license. The nice looking ham lady at the government office informed me of a 1000 Hungarian Forint (1000 Forint = $10) stamp requirement for the filing. I ran down to the nearest shop to get the stamp, but missed the office chief by 1 minute - only he can sign the license. I alluded to her that I have a sched that evening, and I have no license. She replied: "so what! get on your HT and enjoy!" Now **that** I call a ham spirit! (Please do not let this secret out, I do not want to get her fired!) Next morning my signed license was waiting for me!

The document contains Amateur Radio operating information on 23 European countries. Each of the CEPT members have jurisdiction over the license class structures and requirements in their respective countries, provided they meet the CEPT groundrules. There are two major divisions: VHF/UHF licenses requiring no CW (like here) and the HF class licenses. The manual does not differentiate between modes of transmission: CW, AM, SSB, etc. on the bands - no subbands listed.

Morse code: only 2 countries have a 20 wpm requirement for higher class licensees: Hungary and Czechoslovakia (it is a 1992 document, listing Czechoslovakia as one country before it split up). The majority of countries require only 10 or 12 wpm for top class licenses, some 14 or 16. Eligibility minimum age varies quite a bit, 13 to 18 years of age. Hungary and Finland have no age restriction - if you are an adept ham at the age 1 (or less), you may qualify! Privileges by bands are given below:

160M: Allocation varies considerably - 1.81-1.85, 1.83-1.85, 1.915-1.955, 1.83-2.00, UK novices: 1.95-2.00 MHz. Power allocations vary even more wildly: Although very few countries allow up to 1kw, most countries have a 200-400w or so limit, quite a few limit to 10w (!) output level, Ireland: **10w dc input power!!** I wonder how far can you (actually not you - **they!**) talk with 10w input with QRM. Over there the power line voltages are 220 to 240 volts (380/415v 3 phase), a potential for creating even more QRM than our 117v power lines!
80M: With very few exceptions, the band is from 3.50 to 3.80 MHz.
40M: Almost exclusively from 7.0 to 7.1. Some lower class licensees: 7.0 to 7.05 or 7.02 to 7.03.
30M: 10.10-10.15 MHz with the exception of Italy: 10.10-10.11! Real stingy bunch.

20M: 14.00-14.35 except for lower license classes in some countries: 14.05-14.1 MHz.
18M: All countries, like here: 18.068-18.168.
15M: 21.-21.45 for all countries for higher class licensees.
13M: 24.89-24.99 - all countries.
10M: Generally 28.00-29.70. Exceptions: 28.1-28.15 (class "C" license, Spain). Others: 28.225-28.300, 28.30-28.50.
6M: Wildly varies between countries; only Austria allows 50.0-54.0 MHz. The rest: 50.00-50.45, 50.2-52.0, 50.2-51.2 (these countries don't want their hams to talk to other countries?), 50.08-50.40, 50.62-50.76, 51.25-51.75.
4M: (yes, **four** meters): not allowed, except in Ireland 70.125-70.45 and UK: 70.0-70.5 MHz. (How come, we don't have it?).
2M: Generally 144-146 with few exceptions.
70cm: Varies between 432-438, 430-440, 430-439.1.
23cm: The majority of countries allow 1240-1300 MHz. Some others: 1215-1300, lower licencees: 1296-1298 (how generous!), 1240-1325.
13cm: Majority: 2300-2450. Some band restrictions for lower classes in Italy and UK.
9cm: Only Germany-3400-3475 and the Netherlands-3400-3402 (please do not overdo it - a full 2 MHz!).
6cm: Germany - 5650-5850. Band restrictions for some lower class licenses in other countries.
3cm: Nearly all countries - 10.00-10.50 GHz.
1.3cm: 24.00-24.25 or 24.50.
0.6cm: All countries 47.0 to 47.2 GHz.
0.4cm: 75.5-81.0 GHz. Turkey and UK: 75.5-76.0.
0.3cm: 119.98-120.02. Forbidden in Belgium, Czechoslovakia, Denmark, Ireland, Luxembourg, Malta, The Netherlands and Portugal.
0.2cm: 142-149 GHz in most countries.
0.1cm: 241-250 GHz. Forbidden in Denmark, Ireland, Portugal and Turkey.

Large differences exist in the maximum allowed output power between countries in the SHF/EHF bands, varying from 3w to 1000w.

All-in-all, we, here in the US are better off than the European hams considering band allocations and power limits. Enjoy our privileges!

The last pages of the document list the addresses of the Amateur Radio licensing authorities in 32 European countries.

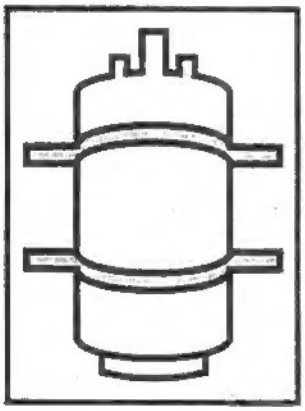
gud DX from 0.1 to 160! 73 de N6DMV

Editors Note: These frequency allocations and power limits are changing constantly. Recently the British hams have been given increased 6 and 160 meter privileges. On the other side of the world the Japanese and Chinese hams have been given increased privileges on the HF bands which should make them even easier to work from the west coast. Changes are published in the DX newsletters and magazine columns, if you are interested in the latest data on a particular country/band contact the ARRL

ESP FOCUS

EARTHQUAKE SURVIVAL PROGRAM
A KEY TO SURVIVAL

BRACE WATER HEATER



WHY

An unbraced water heater can cause a fire!

Past earthquakes have demonstrated the importance of bracing water heaters. Such action can prevent your water heater from toppling over during an earthquake, rupturing the gas line and possibly causing a fire. Bracing your water heater can also preserve a valuable source of emergency drinking water.

Residential water heaters hold 30 to 40 gallons, a supply that can be lost if your water heater falls. Be sure to have a tool to siphon water from the water heater in an emergency. Fitting the water heater and other gas appliances with flexible supply lines can also reduce the threat of an explosion and a fire due to gas leaks. Contact a licensed plumber to install flexible lines if your appliances are not equipped with them.

NOVEMBER

HOW

The following method for bracing residential water heaters located in corners using conduit is recommended by the Division of the State Architect (DSA). Instructions for other methods are available through DSA.

1. Mark the water heater 9" down from the top and approximately 4" up from the top of the controls. Transfer these marks to the wall. Locate wood studs in the wall on both sides of the water heater (see illustration).

2. Using a stud finder or another appropriate method, locate the wall studs that meet the minimum and maximum criteria shown on the illustration.

3. Transfer marks on the water heater horizontally to the adjacent wall where the stud identified in step 2 was located.

4. Drill a 3/16" diameter, 3" deep pilot hole at the locations for the 1/4" diameter by 3 1/2" lag screws.

5. Measure around the water tank and add 2" to the measurement. Cut two pieces of 3/4" x 24 gauge perforated steel plumbers tape to this length. Place a bolt with washer through the end hole of one end and bent out 90 degrees as close to the edge of the washer as possible. Most plumbers tape comes with 1/4" diameter holes 1" apart with 1/8" diameter holes in between. The tape can be easily broken at the smaller holes by grabbing the tape with pliers and bending several times.

6. Place tape around the tank and place bolt with washer through the nearest hole in the end of the tape, place a washer and nut on the bolt and tighten. The tape should be tight. If the tape is not tight, remove the bolt, place it through the next adjacent 1/4" diameter hole and tighten.

7. Using a straight stick, place the end at the hole in wall with the side of the stick against the side of the tape around the tank. Measure the distance from where the stick touches the water heater to the hole in the wall. Add 1" to these measurements and cut 1/2" diameter conduit to this length. Repeat this for each piece of conduit. At the conduit toward the back, you will not be able to use the stick as this will probably place the connection too far to the back to be workable.

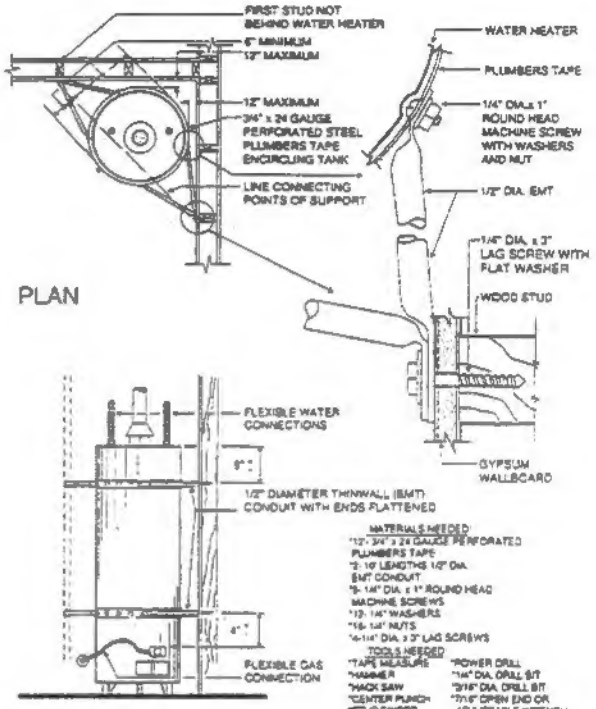
8. Using a hammer or vice, flatten 1" at each end of the 4 pieces. Be sure to flatten both ends of the conduit in the same plane.

9. Drill a hole in one end of each conduit approximately 1/2" from each end. Measure 1" in from each end and bend up at approximately 45 degrees. This angle will have to be corrected slightly as the work progresses. Hold conduit on the wall with the hole in the conduit over hole in the wall and mark the outer end at one of the holes in the plumbers tape. Mark holes in the tape and on the tank and conduit. Take down conduit and drill a hole at the mark for the bolt through the flattened end of the conduit. Repeat for all other pieces of conduit.

10. Loosen the strap around the tank and place a bolt with a washer from the inside through the hole in the strap at all four locations. Tighten the tape around the tank so that the bolts are at the marks on the tank. Positioning of the tape can be difficult, and it may be easier to do one side of the tank at a time. Place conduit on bolt protruding from the strap and place a washer and nut on the bolt and tighten. (A 4d finish nail inserted in the slot in the bolt will prevent the bolt from turning.) Position the opposite end at the hole in the wall and insert lag screw with washer and tighten. Do not drive lag screw with hammer.

11. Repeat the above procedure for the rest of the conduits. (See illustration.)

NOTE: The 1/4" x 1" bolts referred to above are called 1/4" x 1" round head machine screws with nut.



This action sheet is produced as part of the Earthquake Survival Program (ESP). ESP is an awareness campaign designed to increase earthquake preparedness at home and work. ESP was developed by the County of Los Angeles. The Governor's Office of Emergency Services (OES) and representatives of Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara and Ventura counties assist in development of campaign materials and in coordination of the campaign.

"Do More In '94!"

OES ESP EARTHQUAKE SURVIVAL PROGRAM A KEY TO SURVIVAL

Published by: California Office of Emergency Services